

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 85-113

WASTE DISCHARGE REQUIREMENTS FOR:

FMC CORPORATION AND
DESIGNED BUILDING SYSTEMS, INC.
REMEDIAL ACTION PROGRAM
NEWARK, ALAMEDA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board), finds that:

1. FMC Corporation and Designed Building Systems Inc. (hereinafter collectively referred to as the discharger), by a Report of Waste Discharge application dated May 24, 1985, have submitted a remedial action plan for groundwater contamination beneath their facilities in the City of Newark, Alameda County.
2. FMC Corporation (FMC) owns and operates a chemical manufacturing facility located at 8787 Enterprise Drive, Newark, California. This facility currently produces phosphates and phosphoric acid. Other chemicals have been produced at this facility in the past. In particular, Ethylene Dibromide (EDB) was produced at and on a site immediately adjacent to the present facility from the late 1930s or early 1940s until 1968. Designed Building Systems, Inc. (DBS) owns the adjacent site, which was formerly leased by FMC. DBS is a light manufacturing facility which reconstructs mobile facilities for office use.
3. EDB was registered in the United States as a pesticide in 1948. In December of 1980 the United States Environmental Protection Agency (EPA) proposed to cancel registration of EDB for use as a fumigant of stored grain, grain milling machinery, and imported produce. After discoveries in 1982 and 1983 that EDB contamination had been identified in approximately 114 groundwater wells in agricultural areas in Georgia, California, Hawaii, and Florida, EPA immediately suspended the use of EDB as a soil fumigant. The state action level established by the California Department of Health Services (DOHS) for EDB in drinking water is 0.05 parts per billion (ppb).

4. As a result of a study conducted by FMC in late 1980, EDB was discovered in the shallow aquifer (5-20 feet) beneath FMC's Newark facility. A number of other chemical compounds (1,2 dichloroethane (DCA), bromoform, dibromochloromethane, diethyl ether, bromochloromethane, methylene bromide, 1-chloro-2-bromoethane, benzene, bromodichloromethane, chloroform, carbon tetrachloride, and trichloroethylene) have been found but at much lower concentrations. EDB is the most widespread and toxic of the substances found. Extensive subsequent investigations conducted by FMC have delineated the extent of EDB contamination in the shallow aquifer, as shown on Attachment A, which is incorporated herein and made a part of this order. The contaminated volume contains some EDB concentrations greater than 12,000,000 parts per billion (ppb) as measured in subsurface soil samples, and appears to have resulted from inadvertent spills and leaks in the manufacturing and handling operations. The contamination underlies approximately 3 acres of ground surface, including property formerly leased by FMC but now owned by DBS.
5. During and after rainfall events some EDB, at concentrations of approximately 10-40 ppb, has been found in the water in a ditch known as the E-1 ditch which passes through the contaminated zone with a bottom depth of approximately 3 feet beneath ground surface. It is not known whether the contaminated water table rises and discharges through this ditch, or whether rainwater runoff passing through a shallow surface zone picks up the EDB. The E-1 ditch otherwise collects surface drainage during and after precipitation events and is used to convey FMC's NPDES permitted surface discharge approximately 4000 feet to enter Plummer Creek, a water of the United States, at a point approximately two miles upstream of the San Francisco Bay. This water ultimately discharges into the San Francisco Bay National Wildlife Refuge. No detectable levels of EDB have been found in the water in the E-1 ditch during dry weather.
6. Beneficial uses of Plummer Creek, and the San Francisco Bay in the vicinity, are as follows:
 - a. Industrial Service Supply
 - b. Navigation
 - c. Water Contact Recreation
 - d. Non-Contact Water Recreation
 - e. Commercial and Sport Fishing
 - f. Wildlife Habitation
 - g. Rare and Endangered Species Habitat

- h. Marine Habitat
- i. Fish Migration
- j. Fish spawning (potential)
- k. Shellfish Harvesting

7. The discharger proposed in their Report of Waste Discharge to both place a three foot soil cap, and maintain existing asphalt surfacing, over significant portions of the zone of contamination. The proposed soil capping, and existing asphalt capping, will cover all areas of soil contamination greater than 1000 ppb. The present E-1 ditch section through the contaminated zone will be filled and covered by the soil cap. The discharge stream governed under an NPDES permit will be routed through the perimeter surface drainage culverts that will surround the soil-capped area. The perimeter surface drainage culverts will discharge into the E-1 ditch downstream from the soil-capped area.
8. The shallow aquifer in the vicinity of the zone of contamination is underlain by a layer of heavy gray clay approximately 5 feet thick. This layer appears to have halted the migration of EDB in the vertical direction. The estimated 'worst-case' horizontal rate of migration in this shallow aquifer is 15 feet per year. The water in the shallow aquifer is saline and, in the immediate vicinity of the zone of contamination, has no known current beneficial uses.
9. On its own initiative FMC has prepared and submitted a risk assessment entitled, "Health and Environmental Risk Assessment", dated April 1985, which states that no wells exist in the shallow aquifer downgradient of the zone of contamination and that the high salinity of water in this aquifer precludes any beneficial uses. The hydraulic interconnection of the shallow aquifer with salt-producing ponds in the vicinity, and the long term chronic health effects of EDB exposure (as opposed to short term acute effects), either to humans via salt intake, or on wildlife inhabiting the San Francisco Bay and Bay fringe, were not evaluated in the risk assessment. The potential land use of properties downgradient of the zone of contamination, and the possibility of occupational exposure by construction workers, was also not assessed. The form and range of topics covered by the risk assessment were not discussed with Regional Board staff in advance.

10. On the basis of the risk assessment discussed above, the discharger's proposal to remediate contamination in the shallow aquifer was composed of the previously mentioned surface capping, and additional monitoring of the rate of horizontal migration in the shallow aquifer. The discharger proposed to investigate and implement additional remedial actions if any significant increase in the rate of migration of EDB were found.
11. FMC has investigated other remedial options for the shallow aquifer, including purge pumping and treatment of extracted groundwater, soil excavation and disposal, soil excavation with on-site aeration followed by backfilling the aerated soil, and slurry wall containment. Extraction of contaminants by purge pumping was found to be infeasible, due to the nature of the soil matrix in this vicinity, which is composed predominantly of clays with permeabilities in the 10^{-4} to 10^{-5} cm/sec range. Soil excavation and disposal was found to be considerably more expensive than other options, and involves extensive occupational exposure. This option involves voluminous transport to disposal at a Class I waste management unit, and could have adverse environmental impacts equivalent to those at the present location. Soil excavation and treatment by aeration on site involves occupational exposure, requires further testing and evaluation, and may not be able to reduce the level of contamination to levels acceptable to regulatory agencies. Slurry wall containment was proposed in April of 1984, prior to complete definition of the zone of contamination. The slurry wall proposal was replaced by the current proposal following completion of the risk assessment discussed previously, and completion of the February 1985 report on "Evaluation of Selected Mitigation Alternatives."
12. Containment of EDB contamination in the shallow aquifer appears to be a satisfactory remedial action plan. There is a difference, however, between full containment and 'containment' as proposed by the discharger, which would allow migration of EDB. State Board Resolution No. 68-16 (often referred to as 'the non-degradation policy') allows some amount of an inadvertent discharge to remain unremediated, in this case not fully contained, but a demonstration which would allow the Board to implement 'the non-degradation policy' in this regard for the shallow aquifer has not yet been made by the discharger (an adequately expanded risk assessment could provide the basis for such a demonstration). Therefore, the portion of the

discharger's proposal to monitor and take further remedial action with respect to the shallow aquifer if such monitoring indicates a significant increase in the rate of migration of EDB in this aquifer is not in accordance with State Board Resolution No. 68-16, or the Revised Water Quality Plan for the San Francisco Bay Basin adopted by this Board on July 1, 1982, and is not being accepted by the Board in this order.

13. Considerably lower levels of EDB (less than 6600 ppb) have been found in the next aquifer below the shallow aquifer, which is located approximately 50-70 feet below ground surface. This second aquifer is known as the Newark aquifer. Contamination in the Newark aquifer appears to have resulted from drilling operations to install monitoring wells in the Newark aquifer; these wells were installed through the zone of contamination in the shallow aquifer. Boring logs indicate that no natural hydraulic continuity exists between the shallow aquifer and the Newark aquifer in the vicinity of the FMC facility. There is limited evidence, however, that a regional connection exists between the shallow aquifer and the Newark aquifer. It is also known that ACWD well 2P2 is gravel packed in such a way that it may provide an avenue for vertical migration of EDB. The extent of contamination in the Newark aquifer has not been precisely defined, but is calculated to be limited to a distance downgradient of no more than 420 feet from Deep Well 2 (DW-2). The estimated zone of contamination is shown on Attachment B, which is incorporated herein and made a part of this order.
14. The Newark aquifer in the vicinity of the discharger's facilities, and for some distance eastward, is saline. Further eastward the Newark aquifer contains freshwater which is currently used for domestic and industrial purposes. The general regional gradient of the Newark aquifer is toward the San Francisco Bay; that is, from the freshwater zones in the east toward the saline zones in the west. Much of the salinity in western parts of the Newark aquifer is the result of saltwater intrusion due to past overdrafting for domestic and industrial use.
15. The Alameda County Water District (ACWD) started to implement a Salinity Barrier Project (SBP) in the Newark aquifer in July of 1985. The SBP is designed to draw saline water east of a line of extraction wells toward the line of wells until all saline water in the Newark aquifer east of the SBP wells has been extracted. This action will also draw freshwater from the eastern recharge zones of the

Newark aquifer to the SBP wells, enabling domestic and industrial use of groundwaters to resume in portions of the Newark aquifer which are now saline. All water in the Newark aquifer west of the line of SBP wells will remain saline. The discharger's facilities, and the contaminated zone in the Newark aquifer, are west of the line of SBP wells.

16. Implementation of the SBP in this vicinity may accelerate the migration of EDB both horizontally within the Newark aquifer, and vertically from the shallow aquifer to the Newark aquifer. In the absence of actions to prevent it, EDB could migrate to the SBP extraction wells, and be detected in surface discharges under the NPDES permit issued to ACWD for the SBP.
17. Surface discharges from the SBP extraction wells, which might be contaminated by EDB in the longer term, discharge to the South San Francisco Bay by means of Plummer Creek and Newark Slough. The beneficial uses of these waters have been described in Finding 6.
18. FMC has stated that all aquifers beneath the Newark aquifer are also saline. Documentation which substantiates this statement has not been submitted.
19. The Newark aquifer near the zone of contamination has no currently known beneficial uses. The Board's concern with contamination in the Newark aquifer arises from the possibility of migration from the zone of contamination in the Newark aquifer to other waters having beneficial uses.
20. FMC proposed in their submittal of May 24, 1985 to contain contaminants in the Newark aquifer, and to control adverse impacts of SBP pumping, by operating an extraction well and three injection wells which will ring the contaminated zone in the Newark aquifer and hydraulically prevent migration of EDB from that zone. FMC proposes that extracted water will be treated by carbon adsorption and re-injected, together with potable water, to the Newark aquifer.
21. FMC further proposes to stop this extraction, treatment, and re-injection system when the level of EDB at the extraction point reaches 500 ppb. This is the level at which FMC's groundwater model predicts that no more than 0.02 ppb of EDB will ever be found in SBP surface discharges. The groundwater model utilized, and associated parameters and assumptions, have not been verified as accurate in this situation. FMC's proposal in this regard, therefore, does

not satisfy the requirements of State Board Resolution No. 68-16, and is not incorporated in this order. The cited resolution allows some quantity of an inadvertant discharge to remain unremediated in certain circumstances (if doing so "will be consistent with maximum benefit to the people of the State"), but FMC has not yet demonstrated that these circumstances exist for the EDB contamination in the Newark aquifer. Provision C.10. describes the components of a demonstration under which the Board may amend this order to allow some EDB to remain unremediated in the Newark aquifer..

22. The discharger may need, in addition to these requirements, an underground injection control (UIC) permit from the EPA.
23. This Order implements the water quality objectives stated in the revised Water Quality Plan for the San Francisco Bay Basin adopted on July 1, 1982, and is in accordance with the State Board's non-degradation policy.
24. This project constitutes a minor modification to land and is therefore categorically exempt from the provisions of the California Environmental Quality Control Act pursuant to Section 15304 of the Resources Agency Guidelines.
25. This order constitutes an exemption to the requirements of Subchapter 15, Title 23, California Administrative Code, for the containment at the place of release of pollutants unintentionally released to the environment, pursuant to Section 2511 (d) of Subchapter 15. Additional containment measures will be evaluated, however, pursuant to the applicable and feasible provisions of Subchapter 15, as required in Section 2511 (d).
26. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge, and has provided them with an opportunity to submit their written views and recommendations.
27. The Board heard and considered in a public meeting all comments pertaining to the discharge.

IT IS HEREBY ORDERED that FMC and DBS, and any and all other owners of this property in the future, shall meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder and shall also comply with the following:

A. PROHIBITIONS

1. The presence of EDB in detectable concentrations in the shallow aquifer beyond the compliance boundary around the zone of contamination, as delineated in Attachment A, is prohibited unless the Board specifies an allowable concentration in accordance with Provision C.1. and C.2., or the discharger can demonstrate that such presence is not due to activities of the discharger.
2. The discharge of EDB at detectable concentrations, and 1,2 dichloroethane in excess of the state action level of 1.0 ppb, in surface runoff from within the compliance boundary around the zone of contamination in the shallow aquifer as delineated in Attachment A is prohibited.
3. The presence of EDB, or any of the other 12 chemicals named in Finding 4, in the shallow aquifer shall not at any time create a condition of nuisance as defined in Section 13050 (m) of the California Water Code, unless the discharger can demonstrate that such presence is not due to activities of the discharger.
4. The presence of EDB at detectable concentrations in the Newark aquifer outside of the compliance boundary shown on Attachment B is prohibited unless the Board specifies an allowable concentration in accordance with Provision C.10, or the discharger can demonstrate that such presence is not due to activities of the discharger.
5. Injected water shall not contain detectable concentrations of EDB, or 1,2 dichloroethane in excess of 1.0 ppb.
6. The discharge of treated wastewater by injection shall not result in the degradation of groundwater quality.
7. The presence of EDB, or any of the other 12 chemicals named in Finding 4, in the Newark aquifer shall not at any time create a condition of nuisance as defined in Section 13050 (l) of the California Water Code, unless the discharger can demonstrate that such presence is not due to activities of the discharger.

8. The discharger shall not begin injection until the requirements of the federal UIC program have been satisfied.

B. SPECIFICATIONS

1. The discharger shall implement the surface capping, perimeter culverting, and E-1 ditch rerouting, as described in their submittal of May 24, 1985. Currently existing asphalted surfaces over the zone of contamination shall be maintained as 'impervious' surfaces. Alternative capping materials may be substituted for clay if a demonstration satisfactory to the Executive Officer is made that the long-term permeability of the alternative material is equivalent to that of the previously proposed clay cap.
2. The discharger shall install any additional monitoring devices required to fulfill the terms of any Self-Monitoring Program issued to the discharger in order that the Board may evaluate compliance with the Prohibitions, above.
3. FMC and DBS shall place notices in the respective deeds for their properties which inform those who read the deeds that EDB exists in the subsurface environment within specified bounds and at certain concentrations. These deed notices may be revised or eliminated with the written authorization of the Executive Officer if remedial actions reduce the extent or concentration of EDB contamination.
4. Injection of water to the Newark aquifer shall take place as described in FMC's submittal of May 24, 1985, with the exception of such minor subsequent modifications as may be necessary to comply with Prohibitions A.4 thru A.8 of this order. Only water extracted from the Newark aquifer and treated to remove EDB, or potable water, shall be injected to the Newark aquifer, unless another source of water is approved in writing by the Executive Officer on the basis of a demonstration that this other water will not adversely impact actual or potential beneficial uses of the Newark aquifer or any other hydraulically interconnected aquifer.
5. The injection/extraction system shall be designed and operated to contain EDB within the compliance boundary around the zone of contamination in the Newark aquifer,

as described in Attachment B. FMC shall monitor and evaluate water levels as specified in the SMP to substantiate that containment has in fact been achieved.

6. The discharger shall prevent transport of contaminants identified in Finding No. 4 by means of any wells within the compliance boundary delineated on Attachment A which might provide a conduit for contamination to migrate from the shallow aquifer into deeper aquifers.

C. PROVISIONS

1. The discharger shall comply with Prohibition A.1 according to the following time schedule:

<u>Task</u>	<u>Compliance Deadline</u>
a. Submit a proposal for an expanded risk assessment describing in detail the topics to be covered. This proposal shall address, at minimum, the concerns expressed in Finding 9 of this order and those expressed in a letter dated July 5, 1985 from the Department of Health Services to FMC Corporation. This expanded risk assessment proposal must be approved by the Executive Officer prior to its execution.	by December 1, 1985
b. Submit an evaluation of additional containment measures beyond capping the contaminated area, such that Prohibition A.1. can be complied with. This evaluation shall include cost estimates of various containment alternatives at cut-off levels ranging from the limit of detection to 1.0 ppm of EDB, and shall compare these costs with the environmental consequences at the specified cut-off levels, as determined by the expanded risk assessment, which is also to be submitted at	by March 1, 1986

this time. This document shall evaluate hydraulic control in the shallow aquifer by means of extraction wells or other devices and give further consideration to physical containment by means of a slurry wall or other means. If no feasible means of containment can be proposed, removal of EDB shall be re-evaluated.

- c. Completion of implementation of _____ by November 1, 1986 measures which will achieve compliance with Prohibition A.1.
2. If the Executive Officer determines that the expanded risk assessment as submitted fulfills the terms of the proposal previously approved, and has been submitted in a timely fashion, the Board intends to hold a public hearing prior to June 1, 1986 and specify an allowable concentration, and quantity, of EDB which may remain unremediated in the shallow aquifer, if any.
3. The discharger shall comply with Prohibition A.2. and Specification B.1. by November 1, 1985.
4. FMC shall comply with Prohibitions A.4., A.5., A.6., and Specifications B.4., B.5., and B.6., by December 1, 1985, or within 30 days after approval of these actions is granted by EPA, in accordance with the Federal UIC program, if such approval cannot be obtained prior to December 1, 1985.
5. The discharger shall comply with Specification B.3. by November 1, 1986.
6. The discharger shall comply with Prohibitions A.3., A.7., A.8., Specification B.2., and all Provisions of this Order upon its adoption.
7. FMC shall submit, by August 1, 1986, an assessment of the effect of their injection/extraction well system on the transport of 1,2 dichloroethane (DCA) in the Newark aquifer. This assessment shall evaluate the need to protect SBP effluent from contamination with DCA, which appears erratically in Newark aquifer monitoring

wells. Regional Board staff will request neighboring industries which may be sources of DCA to conduct similar such investigations which may be coordinated with FMC's investigation.

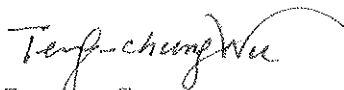
8. FMC shall submit by August 1, 1986 a report documenting the water quality of all deeper aquifers in the vicinity of the former EDB manufacturing facility. FMC shall also, at that time, describe the hydraulic interconnection of the Newark aquifer with deeper aquifers, and the hydraulic gradient and receiving groundwaters for these deeper aquifers. This information can be based on existing and available data.
9. FMC shall submit, by August 1, 1986, an assessment of the effectiveness of the extraction point in reducing the concentrations of EDB in the Newark aquifer. If a decrease in concentration cannot be demonstrated, FMC shall re-evaluate the hydraulic connection between the shallow aquifer and the Newark aquifer, and identify the further steps necessary either to prevent migration of EDB between these aquifers or to control these additional quantities of EDB in the Newark aquifer. If a decrease in concentration can be demonstrated, FMC shall re-estimate the duration, cost, and environmental impact of purge pumping necessary to achieve a set of clean-up objectives ranging from the level at that time to non-detectable.
10. The Board intends to hold a hearing by October 1, 1986 to consider amending this order to allow residuals of EDB to remain in the Newark aquifer unremediated (as permitted by the State Board's non-degradation policy), if the reports required in Provisions 7, 8, and 9 have been submitted in a timely fashion and are determined by the Executive Officer to be technically satisfactory. (This hearing shall be combined with the hearing discussed in Provision C.2., if possible.) The Board shall include among its considerations at that time the following three factors: 1) whether all waters beneath the Newark aquifer do not have beneficial uses and will not transport contaminants into waters which have beneficial uses, or, alternatively, have no hydraulic connection with the Newark aquifer, 2) how well FMC's groundwater model has been substantiated by the results of quarterly self-monitoring reports, and with what confidence it

can thereby be used to predict the residual level of EDB which will not impact SBP discharges and, 3) whether hydraulic isolation of the Newark aquifer from the shallow aquifer in this vicinity has been demonstrated. FMC's extraction well in the Newark aquifer shall continue to extract contaminated groundwater until no EDB is detected, unless such an amendment is made.

11. The discharger shall file with the Regional Board quarterly self-monitoring reports performed according to any self-monitoring program issued by the Executive Officer. This self-monitoring program shall define, for the purposes of this order, what concentration of EDB is considered detectable.
12. The discharger shall maintain all devices or designed features installed in accordance with this order such that they continue to operate as intended without interruption except as the result of failures which could not have been reasonably foreseen or prevented by the discharger.
13. The discharger shall permit the Regional Board or its authorized representative, upon presentation of credentials:
 - a. Entry upon premises in which a treatment facility is located or in which any required records are kept.
 - b. Access to copy any records required to be kept under terms and conditions of this order.
 - c. Inspection of any treatment equipment, monitoring equipment, or monitoring method required by this order.
 - d. Sampling of any discharge covered by this order.
14. The discharger shall maintain a copy of this order at the site so as to be available at all times to personnel operating waste treatment and disposal facilities.
15. This Board considers FMC and DBS to have a continuing responsibility for correcting any problems which arise in the future as a result of these remedial actions or related operations.

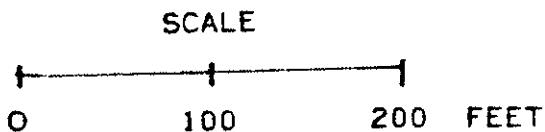
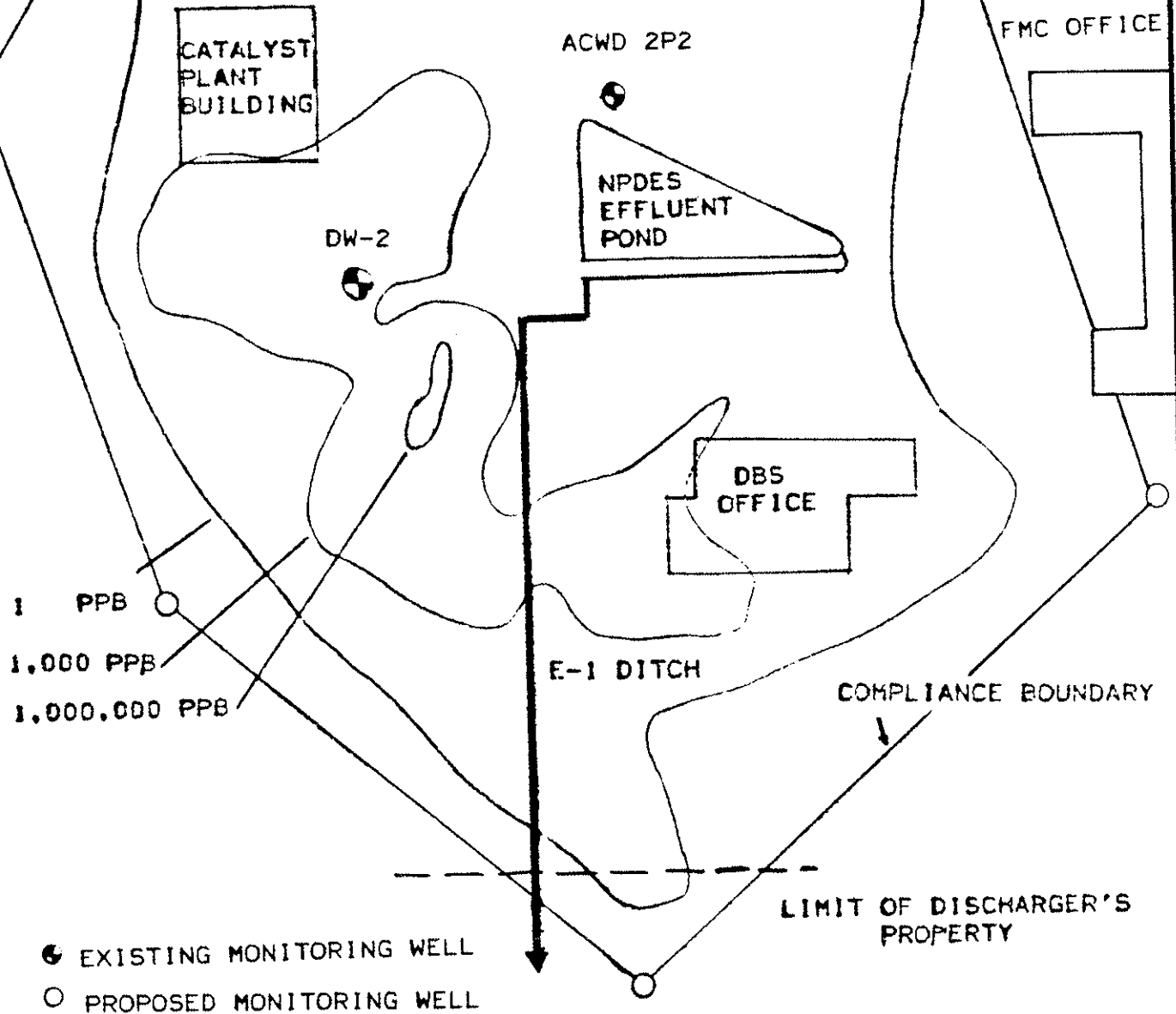
16. The discharger shall file with this Board a report of any material change or proposed change in the character, location, or quantity of compounds contained in place, or discharged intentionally by injection or inadvertantly in surface runoff. For the purpose of these requirements, this includes any proposed change in the ownership of the facility.

I, Roger B. James, Executive Officer, do hereby certify that the foregoing is a full, complete, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on September 18, 1985.


for Roger B. James
Executive Officer

Attachments: A --- Shallow aquifer zone of contamination.
B --- Newark aquifer zone of contamination.

FURTHEST EXTENT OF CONTAMINATION
AS MEASURED IN SOIL SAMPLES AT 15
FEET BELOW GROUND SURFACE



STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ATTACHMENT A
SHALLOW AQUIFER ZONE OF
CONTAMINATION (0-25 FEET)

DRAWN BY: GAW DATE: 8/16/85 DRWG. NO.

ESTIMATED ZONE OF
CONTAMINATION

COMPLIANCE BOUNDARY

THORNTON AVENUE

ENTERPRISE DRIVE

WILLOW STREET

SCALE: 1"=750 FEET

LEGEND

- ▲ FMC INJECTION WELL
- FMC EXTRACTION WELL (DW-2)
- ⬡ ACWD SBP EXTRACTION WELL
- ◆ EXISTING MONITORING WELL
- PROPOSED MONITORING WELL

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ATTACHMENT B
NEWARK AQUIFER ZONE OF
CONTAMINATION

DRAWN BY: *Cam* | DATE: 8/16/85 | DRWG NO.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

FMC CORPORATION
GROUNDWATER REMEDIAL ACTION PROGRAM
NEWARK, ALAMEDA COUNTY

PART A

A. GENERAL

Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13383, and 13387(b) of the California Water Code and this Regional Board's Resolution No. 73-16. This self-monitoring program is issued in accordance with Section C.11. of Regional Board Order No. 85-113.

The principal purposes of a monitoring program by a waste discharger, also referred to as a self-monitoring program, are: (1) to document compliance with waste discharge requirements and prohibitions established by this Regional Board, (2) to facilitate self-policing by the waste discharger in the prevention and abatement of pollution arising from waste discharge, (3) to develop or assist in the development of effluent standards or other limitations, discharge prohibitions, national standards of performance, pretreatment and toxicity standards, and other standards, and (4) to prepare water and wastewater quality inventories.

B. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analyses shall be performed according the most recent version of the EPA document entitled "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", July 1982. (EPA-600/4-82-057), and supplementary documents referred to in the cited document.

Water and waste analyses shall be performed by a laboratory approved for these analyses by the State Department of Health. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his laboratory and shall sign all reports of such work submitted to the Regional Board.

All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

C. DEFINITION OF TERMS

1. A Grab Sample is a discrete water sample collected at any time.
2. Receiving Water(s) refers to any water which actually or potentially receives surface or groundwaters which pass over, through, or under waste materials. In this case the Newark aquifer is the receiving water.
3. Standard Observations refer to:
 - a. EPA Method 601 -- Purgeable Halocarbons. Identify all peaks, including EDB, greater than 1ppb.
 - b. Identification of EDB as follows: EPA Method 601 has been found to be a useful method for the determination of the concentration of Ethylene Dibromide (EDB), although this compound is not listed as one of the 29 purgeable halocarbons which may be determined by this method in the EPA document entitled "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", July 1982. (EPA-600/4-82-057). Achievement of the following detection limits for EDB by means of EPA Method 601 is known to be possible at present for groundwater samples taken from the saline waters beneath the discharger's facility: (1) 1.0 ppb for each grab sample analyzed, and (2) 0.5 ppb as an average of all grab samples analyzed in any one quarter. These detection limits shall be achieved for those samples reported as containing non-detectable levels of EDB, unless the Executive Officer determines, on the basis of analyses of EDB spiked water samples obtained from the aquifer being monitored, that other detection limits or analytical methods are appropriate.
 - c. Water elevation in feet above mean sea level.

D. SCHEDULE OF SAMPLING, ANALYSES, AND OBSERVATIONS

The discharger is required to perform sampling, analyses, and observations according to the schedule specified in Part B, as follows:

- a. DW-5, DW-6, and DW-7 by December 1, 1985.
- b. W-24 through W-28 by April 1, 1986.

E. RECORDS TO BE MAINTAINED

Written reports shall be maintained by the discharger, and shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Board. Such records shall show the following for each sample:

1. Identity of sample and sample station by number.
2. Date and time of sampling.
3. Date and time that analyses are started and completed, and name of personnel performing the analyses.
4. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used. A reference to a specific section of a reference required in Part A, Section B is satisfactory.
5. Calculation of results.
6. Results of analyses, and detection limits for each analysis.

F. REPORTS TO BE FILED WITH THE REGIONAL BOARD

Written self-monitoring reports shall be filed each calendar quarter (unless specified otherwise in Part B) by the 15th day of the following month. In addition an annual report shall be filed as indicated in F.5. The reports shall be comprised of the following:

1. Letter of Transmittal

A letter transmitting the essential points in each self-monitoring report should accompany each report. Such a letter shall include a discussion of any requirement violations found during the past quarter and actions taken or planned for correcting violations, such as operation modifications and/or facilities expansion. If the discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to the correspondence transmitting such schedule will be satisfactory. If no violations have occurred in the last quarter this shall

be stated in the letter of transmittal. Monitoring reports and the the letter transmitting reports shall be signed by a principal executive officer at the level of vice-president or his duly authorized representative if such representative is responsible for the overall operation of the facility from which the discharge originates. The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct.

2. Each report shall include a compliance evaluation summary sheet. This sheet shall contain:
 - a. Results of analyses at the compliance points. (Which are hereby designated as those specified in Part B, Sections I.A., I.D., and I.E.) Any EDB detected at the compliance points shall be reported as a suspected requirement violation in the letter of transmittal.
 - b. A graphic description of the velocity and direction of groundwater flow in both the shallow and Newark aquifers, based upon all water level measurements specified in Part B. In addition, groundwater elevations in all Newark aquifer wells specified in Part B should be predicted each quarter, and compared with the actual measurements obtained. This graphic demonstration must demonstrate full containment of the known contaminated area in the Newark aquifer.
 - c. A tabular summary of the detection limits achieved in all analyses conducted this quarter, and a comparison with the maximum and average detection limits specified in Section C.3.b. of this Self Monitoring Program .
3. A map or aerial photograph shall accompany each report showing observation station locations.
4. Laboratory statements of results of analyse specified in Part B must be included in each report. The laboratory director shall sign the laboratory statement of analytical results.

5. By January 31 of each year the discharger shall submit an annual report to the Regional Board covering the previous calendar year. The report shall contain:
 - (a) Tabular and graphical summaries of the monitoring data obtained during the previous year.
 - (b) A comprehensive discussion of the compliance record, and the corrective actions taken or planned with may be needed to bring the discharger into full compliance with the waste discharge requirements.
 - (c) A written summary discussion of the predictive accuracy of the groundwater model being employed to predict water elevations. This shall include an evaluation of the aquifer parameters used, any changes in the values of those parameters which may have been tried in order to increase the accuracy of the model (sensitivity analysis), and a discussion of the applicability of the optimum aquifer parameters for the small domain surrounding the FMC facility to the larger subsurface domain which includes the SBP extraction wells.
6. A well drilling log shall be submitted for each sampling well established per this monitoring program, as well as a report of inspection or certification that each well has been constructed in accordance with the construction standards of the Alameda County Water District. These shall be filed within 30 days after well installation.

Part B

I. DESCRIPTION OF OBSERVATION STATIONS AND SCHEDULE OF OBSERVATIONS.

A. Groundwater compliance monitoring

<u>Station</u>	<u>Description</u>	<u>Observations</u>	<u>Frequency</u>
W-4, W-24 thru W-28	Located as shown on the map attached	Standard observations a and b	Once each quarter
DW-3 thru DW-7	Located as shown on the map attached	Standard observations a and b	Once each month

B. Groundwater gradient monitoring

<u>Station</u>	<u>Description</u>	<u>Observations</u>	<u>Frequency</u>
W-1 thru W-28, DW-1 thru DW-7, ACWD wells 2P1, 2P3, 2P4, 2N1	Located as shown on maps in the Report of Waste Discharge	Standard observation c	Once each month

C. Groundwater extraction monitoring

<u>Station</u>	<u>Description</u>	<u>Observations</u>	<u>Frequency</u>
DW-2	Located as shown on the map attached	Standard observations a and b.	Every two weeks

D. Groundwater treatment monitoring

<u>Station</u>	<u>Description</u>	<u>Observations</u>	<u>Frequency</u>
GT-1	Carbon treatment system effluent line	Standard observations a and b	Every two weeks

E. Surface runoff monitoring

<u>Station</u>	<u>Description</u>	<u>Observations</u>	<u>Frequency</u>
E-1	Located as shown on the map attached	Standard observations a and b	Once each month during a rainfall event, from Nov. 1 thru May 1

II. CONTINGENCY REPORTING

- A. A report shall be made in writing to the Regional Board within 7 days if the presence of contaminants in excess of the prohibited concentrations is found at any of the compliance points. The discharger shall immediately resample all compliance points where the suspected violations have occurred.
- B. If the resampling and analysis confirms the earlier finding of prohibited contaminants outside either of the compliance zones, the discharger must submit within 90 days an amended Report of Waste Discharge for establishment of a verification monitoring program meeting the intent of Section 2557 of Subchapter 15, Title 23, CAC.
- C. If the presence of prohibited contaminants outside the compliance zones is verified it will be concluded that the discharger is out of compliance with Board Order No.85-113. In this event the discharger shall submit to the Regional Board within 180 days an amended Report of Waste Discharge requesting authorization to establish a corrective action program meeting the intent of Section 2558 of Subchapter 15.

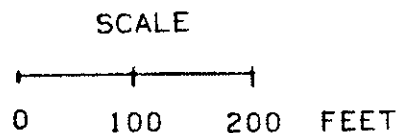
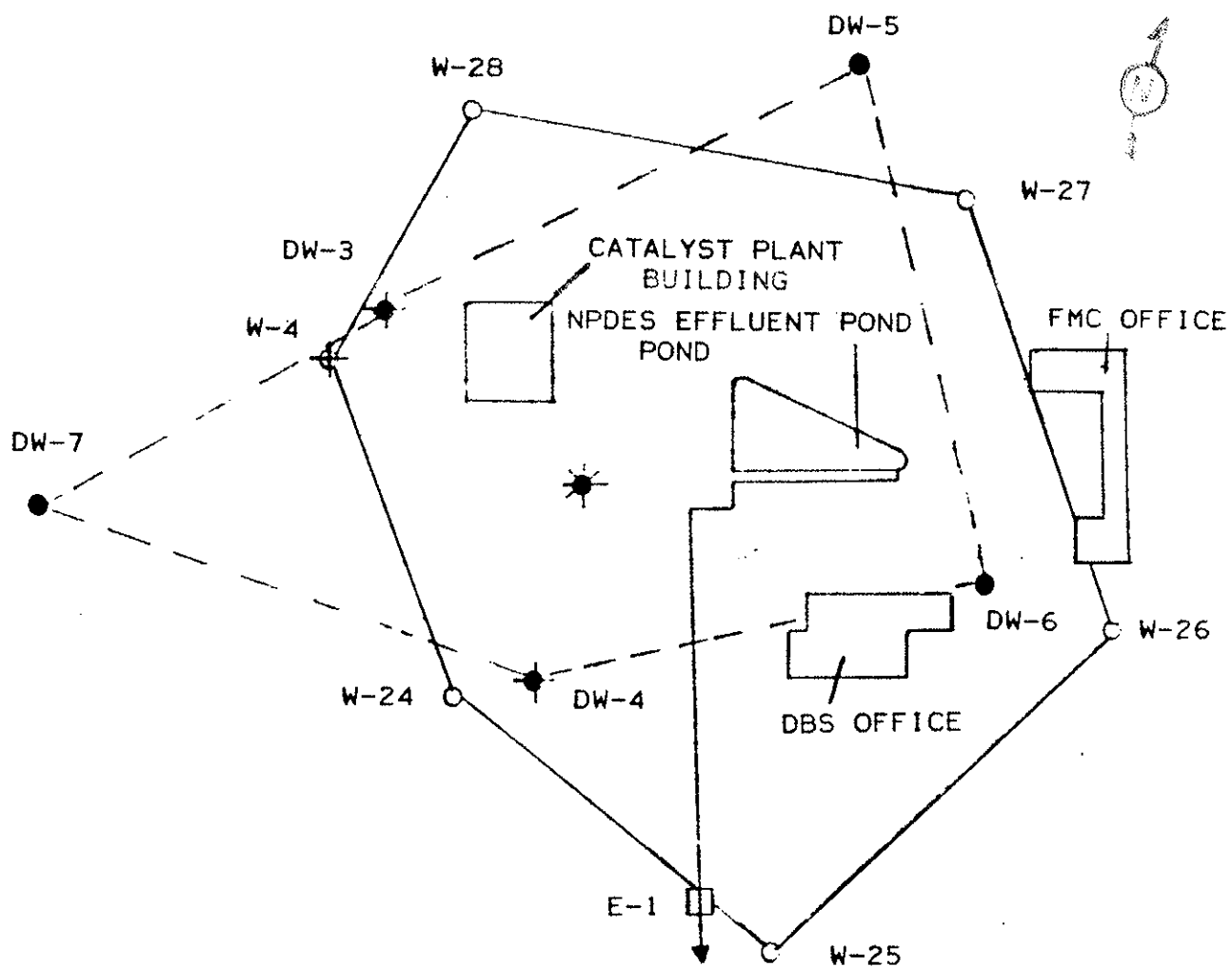
I, Roger B. James, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Regional Board Order No. 85-113.
2. Is effective on the date shown below.
3. May be reviewed or modified at any time subsequent to the effective date, upon written notice from the Executive Officer or request from the discharger.


for Roger B. James
Executive Officer

September 18, 1985
Date Ordered

Attachment: Map



LEGEND

- SHALLOW AQUIFER COMPLIANCE BOUNDARY
- ⊕ EXISTING WELLS
- PROPOSED WELLS
- - - NEWARK AQUIFER COMPLIANCE BOUNDARY
- ⬤ EXISTING WELLS
- PROPOSED WELLS
- SURFACE RUNOFF COMPLIANCE POINT
- ★ EXTRACTION WELL (DW-2)

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SMP MAP
COMPLIANCE POINTS
FMC, NEWARK

DRAWN BY: GAW DATE: 8/16/95 DRWG. NO.